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ABSTRACT

Applications of telecommunications technologies in rural businesses, schools, health care institutions, and government agencies can help make these institutions more efficient and effective, overcome problems of rural isolation, and diversify rural economies. This report considers some of the issues surrounding these possibilities and discusses the challenges raised by two requirements for such benefits to accrue: the need for a rural public telecommunications infrastructure that is capable of supporting advanced equipment and services at reasonable prices; and the need for communities to make informed decisions about the planning, purchase, implementation, and evaluation of new information technologies. Four primary goals are recommended: (1) a rural service delivery system comparable to the urban infrastructure in quality, availability, and cost; (2) adequate preparation of rural communities to plan for, implement, and evaluate new services and equipment; (3) access by rural communities to adequate capital financing and other sources of funding for equipment and services; and (4) telecommunications-related development strategies that are integrated with the larger economic development strategies of the community and region. More specific suggestions are also delineated. The report calls for a coordinated effort by telecommunications policy makers, the telecommunications industry, and economic development professionals to help achieve these goals. (RAH)

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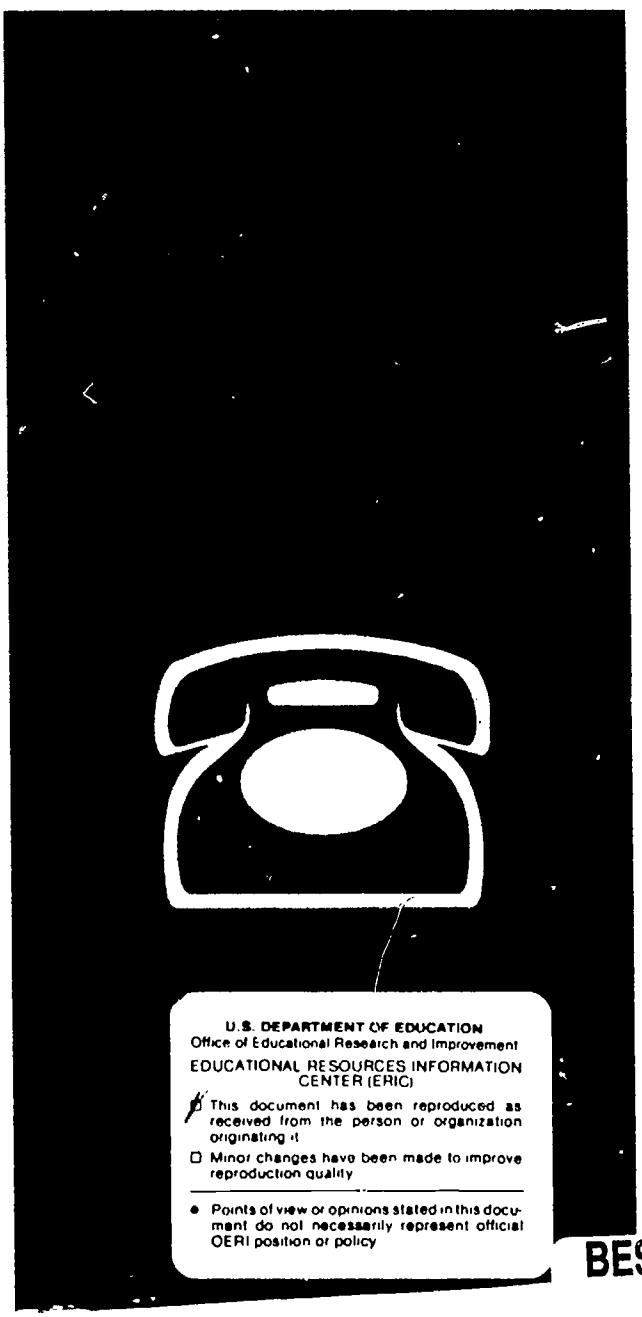

White Paper on Telecommunications and its Impact on Rural America

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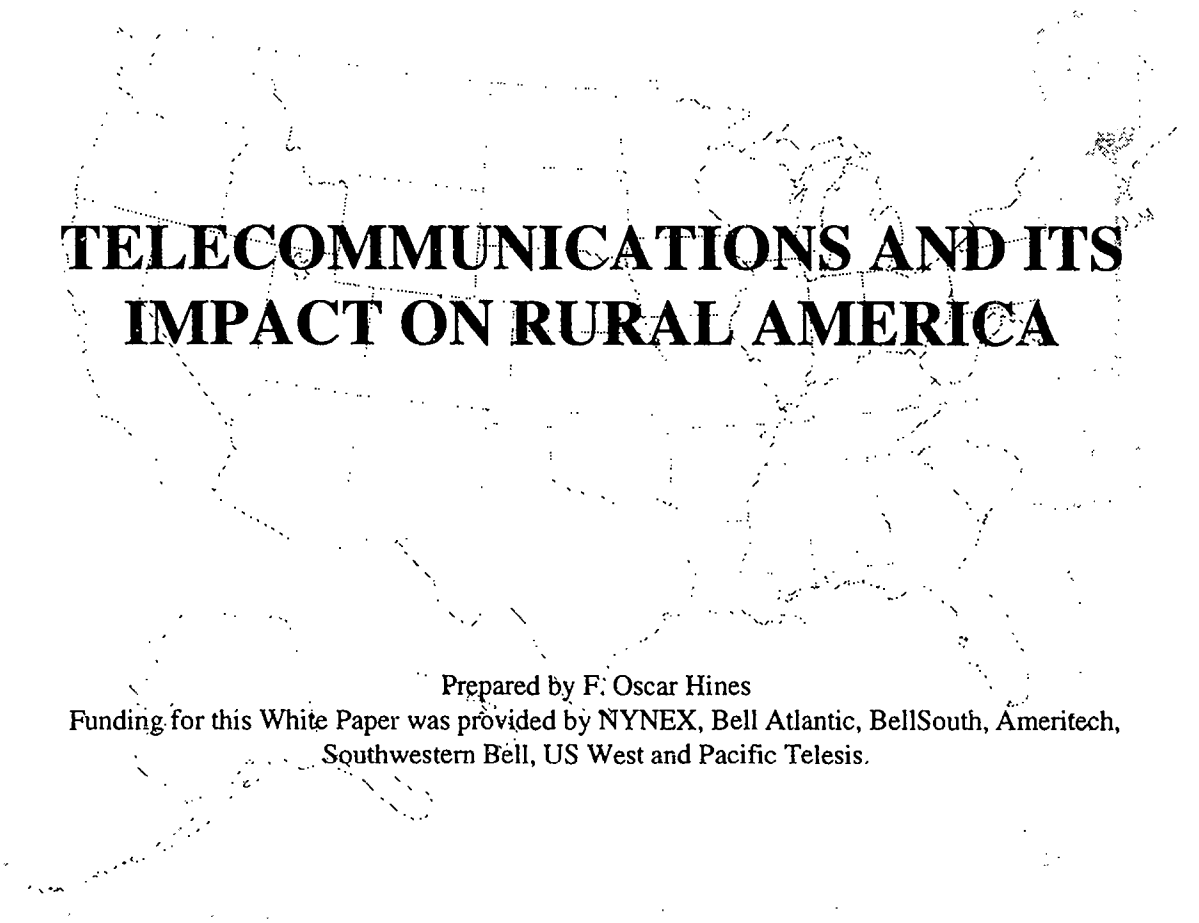

TELECOMMUNICATIONS AND ITS IMPACT ON RURAL AMERICA

Prepared by F. Oscar Hines

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Executive Summary

Telecommunications has significant potential to contribute to economic development in rural America. Applications of information technologies in rural businesses, schools, health care institutions, and government agencies can help make those organizations more efficient and effective, help them to overcome the "rural penalty" that results from geographic isolation, and help rural communities to diversify their economies. This report describes some of these applications, and the opportunities they present for rural communities.

For the full power of these opportunities to be realized, however, action is required by many different players in a number of jurisdictions and industries. We must work together to meet two requirements:

- A rural public telecommunications infrastructure that is capable of supporting advanced equipment and services at reasonable prices; and

- Community preparedness to make informed decisions about the planning, purchase, implementation, and evaluation of new information technologies.

This report discusses the challenges raised by these two requirements. Changes in market structure and technological advancements are threatening many of our traditional policies for achieving universal service, which leaves rural America especially vulnerable. We will need to find new means for assuring that all Americans have access to basic telephone service, and that, as new advanced services are made available in urban areas, they are introduced in rural areas, as well.

The challenge to prepare rural communities to use telecommunications technologies effectively is just as formidable. We need new partnerships that will improve communication among telecommunications providers and policy makers, economic development professionals, and rural communities. We must also look for new ways to inform potential

customers about telecommunications applications, and give them the skills to deploy those applications effectively.

We suggest the following set of goals for the telecommunications industry and policy makers:

1. **Comparable Service Delivery: The telecommunications infrastructure in rural communities should support services that are comparable in quality, availability, and cost to those provided by urban infrastructure.**

2. **Community Preparation: Rural communities should be familiar with the types of telecommunications services available in their community, and have the skills to plan for, implement, and evaluate new services and equipment effectively.**

3. **Access to Funding and Financing: Rural communities should have access to adequate capital financing and other forms of funding for telecommunications-related equipment and services.**

4. **Economic Development Strategy: In each rural community, telecommunications-related development strategies should be integrated with the larger economic development strategies of the community and region.**

We have included several recommendations that will help achieve these goals. The recommendations support the two requirements of creating an adequate and affordable telecommunications infrastructure and preparing our communities to take advantage of such an infrastructure.

Our first set of recommendations target national and state policies that assure rural America has an adequate and affordable telecommunications infrastructure. These recommendations are based on the assumption that competition in the telecommunications industry is both desirable and inevitable, and that the role of policy makers should be to facilitate that competition and safeguard consumer interests. These recommendations include:

- Lift current restrictions on increased competition in the telecommunications industry including long distance telephone, local telephone and cable television services as well as manufacturing and other communications related services

- Protect rural communities from potential negative effects from competition which may result in reduced capital investments in rural telecommunications through appropriate timing of local competition and universal service safeguards

- Bring down long distance rates through increased competition and extended local calling areas

- Protect universal service funds and broaden the base of contributors to universal service to include all providers of telecommunications services

- Create a new definition of basic telephone service for all consumers that evolves over time to take advantage of new technologies

- Support infrastructure sharing between larger and smaller local telephone companies in order to allow rural customers access to advanced telecommunications services

- Provide incentives for local telephone companies to invest in rural telecommunications infrastructure through alternative state regulations

The second set of recommendations target rural communities, telecommunications providers, and economic development professionals in order to help them prepare for the opportunities that an expanded information infrastructure provides in job creation and economic growth. These recommendations include:

- Include telecommunications strategies as a component within comprehensive, locally based economic development plans which are created in partnership with regional development agencies

- Create opportunities for better communications and interaction between telecommunications companies and economic development professionals

- Better educate rural leaders in government, education, and key industries about

telecommunications technologies and applications

Include the creation and funding of telecommunications strategies as an integral part of existing federal rural development programs

Introduction: Telecommunications and Rural America

The Restructuring of Rural America

Rural America is in a state of transition. Traditional rural industries such as agriculture, manufacturing, and natural resource extraction have experienced workforce declines, due both to increased international competition and to automation. The displacement of rural workers has threatened the overall vitality of rural areas. About three-quarters of rural counties have experienced outmigration in the last decade, as rural workers have moved to the suburbs and cities in search of jobs. Per-capita income in rural areas is roughly two-thirds that of urban areas, and rural poverty rates now exceed urban poverty rates.

This decline in rural America's traditional economic base is part of a world-wide economic restructuring. Competition has become global, and many U.S. manufacturing jobs have moved abroad in search of lower wage rates and other benefits. The U.S. economy has become more dependent upon service industries for employment and income: one-third of all U.S. workers are now employed in service industries. In rural communities, this trend has been slower, with approximately twenty-one percent of rural employment remaining in the manufacturing sector. Because there is a great deal of diversity within rural American, there is no single set of development strategies that is appropriate for all rural communities. Some communities have targeted new service industries as the source of their growth; others are striving to improve the competitiveness of their existing manufacturing businesses. Almost all rural communities are looking at the quality of their education, health, and government services as part of their overall development plans.

Computer and telecommunication technologies are an important part of these strategies. As we will explore in more detail in the following sections, these technologies have great

potential to help rural America stabilize and thrive. The promise of an "information superhighway" that links urban and rural areas with interactive voice, data, and video connections is receiving a great deal of interest from the Administration, other policy makers, and the general public. As an association of rural economic development organizations, NADO believes that economic development professionals can play an important role in discussions regarding our nation's telecommunications infrastructure. This report introduces our thinking on the topic; we hope it will facilitate discussion within the economic development community and help bring economic development professionals into telecommunications policy making and planning.

The Potential of Information Technologies in Rural America

As we enter the "information age," one factor that helps determine competitiveness in almost all operations -- manufacturing, services, education, health care, and government -- is the degree to which new information technologies are used effectively. Information technologies include computer and telecommunications hardware and software: personal computers, modems, high-speed data lines, teleconferencing systems, etc. There is no doubt that the effective use of information technologies is essential if rural communities are to remain vital. Information technologies provide rural businesses, nonprofits, and government agencies with the same competitive advantages they offer to their urban counterparts: efficiency and effectiveness in operations, marketing, and record-keeping. But information technologies are even more essential to rural organizations, because they can help to overcome two barriers to rural growth: geographic isolation and economic specialization. New technologies can help rural communities improve their efficiency and effectiveness; overcome aspects of the "distance penalty;" and diversify their local economies.

Improve Efficiency and Effectiveness

No matter what the economic base of a particular rural community, information technologies can boost the competitiveness of its businesses and the help make its social and government agencies more effective. Most service jobs, for example, involve creating and managing information; new technologies can speed and streamline these processes. Even

traditional industries that manufacture goods or provide non-information services are now "information intensive," as they rely on information technologies to manage their operations and maintain contact with customers and suppliers. The same efficiencies are available to schools, hospitals, and government agencies. Not only do information technologies improve these organizations' efficiency; they can also make new types of services available to clients.

Overcome Geographic Isolation

The nonmetro economy has grown faster than the metro economy in some years, slower in others. But it has always grown more slowly than overall economic factors suggest it should. Furthermore, the more rural the county, the more it lags behind its potential. The lag seems due to a "rural factor" that represents a penalty for isolation, distance, small size, and other drawbacks of being apart from urban centers."[1]

As economists have begun to collect more rigorous data about rural areas, they have been able to confirm what some rural communities already knew: that rurality, itself, can be a barrier to economic growth. Even when one takes into consideration differences in industrial composition, region, the cost of labor, education levels, demographics, and macro-level economic conditions, these factors still do not explain all of the differences between rural and urban job growth. Spatial differences themselves, possibly including higher costs of transportation, more work time devoted to transportation, and less access to business services that are centered in cities, appear to put rural areas at a relative disadvantage.

While rural businesses and other organizations will always be faced with some aspects of this "distance penalty," new telecommunications facilities can help reduce some distance-sensitive costs of operation. For service-oriented businesses that deal in information as their raw material, telecommunications can make it easier to provide service from rural communities. Rapid microprocessing and global telecommunications can enable rural areas to communicate with and transfer information to even the most distant areas instantaneously. Rural manufacturers and farmers can also take advantage of these technologies to stay in

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[1]Timothy S. Parker, "Nonmetro Job Growth Lags Its Apparent Potential," Rural Development Perspectives, vol. 7, no. 1, 1991, p. 15.

constant contact with markets and suppliers. While physical transportation costs may continue to be higher for rural operations, telecommunications can mitigate these costs and substitute for some types of travel.

Achieve Economic Diversification

Another problem that has hindered rural development efforts in the past is the typical lack of economic diversification in rural areas. Rural developers have often focused on their core industry, and spent inadequate time trying to develop alternative employment opportunities. This has made these communities very vulnerable to economic downturns, and helped reinforce the "boom-and-bust" economies that hobble rural stability.

New computer and telecommunications technologies are an important tool of economic diversification. They can help primary manufacturers move into secondary manufacturing, and help some companies expand into service-oriented dimensions of their traditional businesses. Some manufacturing and extraction firms that have adopted efficient new waste reduction techniques, for example, are now setting up consulting businesses to sell their techniques and assistance to other firms. In some cases, they are able to "export" their new services to a much wider market than one to which they sell their primary goods. Other service-oriented businesses are moving to rural areas to escape some of the problems of doing business in urban areas; telecommunications technologies help support these long-distance partnerships and businesses.

It is clear that information technologies can play a catalytic role in helping offset the effects of the shift away from traditional rural industries. The availability of new technologies and services can provide rural America with some of the tools necessary to revitalize its economy. These tools can revitalize existing businesses, enable rural businesses to overcome distance barriers, and help rural areas attract new industries. In addition, information technologies can provide significant benefits to existing education, health, and government agencies.

Telecommunications Requirements for Rural Communities

In order for rural communities to take advantage of these opportunities, however, two requirements must be met. First, rural communities need a public telecommunications infrastructure that is capable of supporting advanced equipment and services at affordable prices. The public telecommunications infrastructure serves as a platform for various services and equipment needed by rural businesses, organizations, and families. These customers apply those services to meet their everyday needs, which can lead to economic development and improvements in the quality of life for rural residents.

Second, rural customers must be prepared to make informed decisions about the planning, purchase, implementation, and evaluation of new information technologies. Both of these requirements are necessary if rural communities are to take advantage of the opportunities posed by new information technologies; if a community is weak in one, the positive impact of the other will be diluted.

Special Challenges for Rural Areas

While urban areas also have these requirements, there are several factors that lead NADO to be especially concerned about the challenges they present in rural communities.

Density of Urban Markets

In the last fifteen years, the marketplace for computer and telecommunications equipment and services has become extremely competitive, both nationally and internationally. The trend toward digitization has torn down some of the boundaries among traditional industries (telephone, computer, cable, television, wireless communication, etc.), and firms from all of these industries are racing to respond to market demand for communication capabilities.

In this competitive rush, firms are investing their resources where demand is the most concentrated; in most cases, this is in urban areas. Cities like New York and Chicago, for

example, have competing "fiber rings:" miles of fiber optic cable that allow companies to connect directly to each other and to long-distance carriers, without going through local telephone company switches. It is no accident that these rings have been built in the largest cities, where thousands of information-intensive industries are located, rather than in small communities with a few dozen businesses. The same logic applies to sales of telecommunications equipment and services; why would a sales person drive four or five hundred miles to call on a few potential business customers, when he or she can make that many contacts in a single morning in a city?

Shifting Cross-Subsidies in Telecommunications Provision

In response to new technologies and increased market competition, telecommunications policy makers have been forced to restructure some of the policies that have governed telecommunications since the 1930s. These policies have been built on a set of cross-subsidies that have allowed companies to provide basic telephone service at relatively low rates, making up the costs by charging higher prices to long-distance callers, business users, and urban customers. While there are disagreements about the exact amount of these cross-subsidies, everyone agrees that they are becoming increasingly untenable, as new competitors come in and "pick off" any customers that are implicitly paying into the cross-subsidies. This leaves policy makers and "providers of last resort" (telephone companies whose original monopoly position gave them responsibility for serving all customers) looking for new pricing structures that more accurately reflect costs, while assuring that all customers can still afford basic telephone service.

Rural communities are especially vulnerable to these shifting cross-subsidies. In rural areas served by large local telephone companies, the costs of providing rural service have been subsidized ... part by higher-than-cost charges to suburban and urban customers; as more competitors enter the urban local telephone markets, however, the sources of these subsidies will slowly dry up. In rural areas served by both Bell and independent telephone companies, subsidies also come through higher "access charges," the charges that the local companies charge to long-distance carriers for use of their networks as well as local toll charges, from calls outside of the immediate calling area yet not considered long-distance. These subsidies are also in danger, because long-distance carriers, and rural customers who

make many long-distance calls, are beginning to rebel against paying more than their share of the rural local telephone company's costs.

In general, it is likely that increasing competition in telecommunications will lead to all customers paying charges that more accurately reflect the actual costs of providing their service. Cross-subsidies are likely to become more explicit, and more targeted to specific customers with financial need. For rural customers, this is likely to lead to increases in basic telephone charges, which will be offset by decreasing long-distance charges for customers who make many long-distance calls. As new services become possible, rural customers may have to pay more for them than their urban counterparts, or they may have to work harder at aggregating their demand so that the costs are shared over larger numbers of users, like in urban areas.

Barriers to "Technology Diffusion" in Rural Areas

"Technology diffusion" refers to the rate and extent to which new technologies are adopted. All kinds of factors can influence this: Do potential adopters know about the technology and how it is used? Does the technology meet their needs? Do the potential adopters have the wherewithal to purchase and implement the technology? Are there support personnel (consultants, installers, repair experts, etc.) to help the potential adopter? Is the technology priced such that the adopter can profit from its use?

Rural communities must often answer "no" to questions like these. If a woman single-handedly runs the only insurance business for fifty miles, for example, she might have a harder time finding out about a new software package than her counterpart in a large city, who employs twenty people and has regular lunches with other insurance agents. Rural businesses and other organizations might also have more difficulty finding loans or grants to pay for new technologies, and they rarely have a consultant or repair person only a few minutes away, as an urban user might. Finally, some new technologies or software packages might be designed with the needs of large users in mind, making it more difficult for small, rural businesses to meet their needs affordably.

Potential of New Technologies To Drain Rural Economies

Policy makers should also realize that advanced telecommunications capabilities can be a double-edged sword. Just as enhanced telecommunications holds the promise for brighter economic futures and stronger communities for rural America, it could also spell disaster for communities that are left unprepared.

The extended economic decline and persistent social problems that plague many rural areas have put them at a disadvantage to many urban areas as we enter the information age. Heretofore isolated (and somewhat protected) rural markets could be opened up to competition with urban areas through telecommunications. Telecommunications has the potential to increase job opportunities in rural areas, but it also allows urban firms to compete more effectively in rural markets. Just as rural businesses can serve urban clients via telecommunications, urban businesses can serve rural clients. This holds especially true for service industries, the fastest growing sector of the U.S. economy. As a result of telecommunications, local economies in rural areas will ultimately be less protected by geography and distance than ever before.

Conclusion: Telecommunications is a Vital Issue for Rural America

All four of these factors raise important concerns about the future of the rural telecommunications infrastructure. Will competition and new telecommunications policies lead to more telecommunications opportunities for rural America? What types of policies do we need to assure that the interests of rural America are protected? What can we do to prepare rural communities to use new information technologies effectively?

NADO recognizes the important contributions that new information technologies can make in rural economies, and that we must begin addressing the above questions. This report reviews the contributions of information technologies in four sectors of the rural community: business, education, health care, and government. It then considers two telecommunications requirements of rural communities: a public telecommunications infrastructure capable of supporting advanced equipment and services at affordable prices; and the technological

preparedness to make informed decisions about planning, purchasing, implementing, and evaluating new information technologies. The report reviews the issues raised by each of these requirements, and discusses possible actions to address them. The report concludes with recommendations to policy makers, telecommunications providers, economic development professionals, and rural communities themselves.

Advanced Telecommunications Applications in Rural America

Applications for Business Users

Rural communities depend upon local businesses for employment, tax revenues, and leadership expertise. A community with a stable, vital business sector is a community whose citizens can meet their goals and fulfill their potential; a community with a struggling business sector will soon find itself unable to meet its citizens' needs for employment, education, and social services.

For rural businesses, state-of-the-art telecommunications and computer technologies are necessary for survival. These technologies help businesses improve their efficiency and effectiveness, and allow them to respond more quickly to consumer demands and market shifts. New technologies also help businesses deal with increasing demands for record-keeping, including personnel files, accounting records, and tax filings.

Automation Drives Business Demand for Computers and Networks

While the public most often thinks of new technologies in "high tech" industries like biotechnology, telecommunications and computer technologies are being implemented in all businesses, from the small machine shop to the family farm. This implementation usually happens in stages. First, businesses automate individual tasks, such as entering their payroll records into a computer program or setting up an inventory control system. Second, they begin to tie together these "islands of automation" into networks and systems that automatically transfer information from one department or function to another without repetitive data entry. A manufacturing firm, for example, might integrate its materials requirements and inventory control systems with its production, accounting, and billing

systems, thereby automating much of the "paper trail" that was formerly tracked by hand. Such integration begins to allow for "flexible manufacturing," with just-in-time inventories, quick market response, and consumer-driven, differentiated products.

Service industries have also improved their efficiency and effectiveness through automation. The banking and insurance industries, for example, have used computers and computer technologies to transform themselves from slow-moving, paper-intensive industries into streamlined "information industries," with electronic record-keeping and automated transaction processing. New forms of input/output devices, from the touch-tone telephone to the automated teller machine, have transferred to customers some of the tasks previously carried out by bank personnel and customer service representatives.

To achieve these efficiencies, businesses have relied on private investments in equipment and software, as well as on public investments in telecommunications infrastructure. An independent farmer, for example, may access up-to-the-minute market price information by using a modem and a telephone line to dial into an electronic service via the public telephone network. A large manufacturer that needs constant communication among its computers in three states may rent or purchase private-line connections from a combination of local and long-distance telephone providers. As more and more businesses recognize their need for appropriate telecommunications capabilities, providers are responding with a wider range of services, from private lines and 800-numbers to office parks that provide tenants with local area networks, broadband capabilities, and telecommunications technical support. For example, the Paducah Information Age Park in Paducah, Kentucky, is a 600-acre office park that offers tenants access to video-conferencing, high-speed fiber optic lines, and ISDN capabilities.

Integration Among Businesses and Customers: The Next Stage

With many businesses having streamlined their internal operations, the trend in business applications is now toward improved coordination among businesses and between a business and its customers. In manufacturing, this trend is seen in the explosive growth of electronic data interchange, or EDI. To cut production cycle times and react more quickly to consumer demand, manufacturers have agreed on EDI standards that allow firms to trade inventory and

production data automatically, with different companies' computer systems tied directly together. For a small manufacturer who relies on business from large "core" manufacturers, having an EDI capability is essential for business; without it, the small firm can't even bid on contracts.

This inter-business integration is taken even further in "flexible manufacturing networks" (FMNs), groups of firms that work together to produce or market a product or service that none could produce individually. FMNs are usually made up of small firms that share personnel, equipment, and information systems in order to cooperatively produce products. FMNs are a vehicle through which small, rural companies can band together to address national and international markets. Their need for timely, shared information make them dependent on new computer and telecommunications capabilities.

Business are also using new technologies to extend their contact with customers. Automated teller machines and 800 numbers are two examples of telecommunications applications that have allowed businesses to extend their customer services while containing costs. Telemarketing and catalog shopping also rely on telecommunications connections, and pose new opportunities for rural areas to compete favorably for consumers' business. For rural areas whose economies rely on tourism, tying into regional tourist information systems and national reservation networks is a new strategy for attracting visitors.

New Telecommunications-Based Businesses

Telecommunications and computer technologies have created opportunities for new types of business. Because companies rely on their ability to react quickly to consumer demand, and because time is a competitive resource, companies can afford to pay a premium for concise, accurate, relevant, timely information. "Information brokers" are people who have made a career out of locating and packaging information that clients are willing to buy. With government agencies, universities, and nonprofit groups producing all kinds of public-domain information and reports, information brokers can use their computers and modems to locate, interpret, and re-package many kinds of valuable information. In addition, personal information--about people's spending habits, medical histories, criminal records, and demographics--are of great value to marketers, which has resulted in increased collection and

packaging of such information by information entrepreneurs.

Telecommuting

"Telecommuting" is usually defined as working at home or at a remote work center, instead of commuting to work each day. The "tele-" in telecommuting derives from the assumption that workers rely on telecommunications facilities--including telephones, computers and modems, electronic mail, and voice mail--to allow them to stay in touch with the office, and with clients, while working remotely.

When it was first introduced in the early 1980's, telecommuting was conceived as a substitute for full-time, at-the-office work; huge savings in commuting time and environmental pollution were predicted to go along with the large percentage of "information workers" who would soon be working at home full time. After ten years of actual experience with telecommuting, we now know that there are several kinds of telecommuting, and that each has particular benefits for workers, employers, and the environment. We know, for example, that most workers telecommute only one or two days per week; they maintain offices both at work and at home.[2] We also know that some workers drive to, then telecommute from, "work centers," which are satellite offices that are closer to home, and connected to work.

Most telecommuting projects have been undertaken in densely urban areas, where the need to cut commuting time, traffic congestion, vehicle emissions, and office-space costs is the greatest. However, a few states, including Kentucky and Washington, have looked at rural telecommuting possibilities. Rural residents often travel fifty or sixty miles to work, and cutting down on the number or length of these trips could cut workers' transportation costs and boost productivity. In a study of 57 urban managers who telecommuted at least one day per month to their jobs in New York City, the managers perceived several benefits of telecommuting: flexible work schedule (75%); less time spent commuting (68%); less aggravation of commuting (47%); save money (30%); spend more time with family (18%);

[2]Patricia Mokhtarian, "Telecommuting and Travel: State of the Practice, State of the Art," Transportation, vol. 18, 1991, pp.319-342

and more productivity (14%).[3] Rural employees and employers could realize even larger benefits, because the distances they travel to work are longer.

Telecommuting could also shift jobs into rural areas that have a well-prepared, under-employed work force. Telecommuting could help attract urban and suburban workers to rural areas that have the other amenities they desire, perhaps reversing rural out-migration trends in those areas.

U.S. West, Pacific [illegible]nd MCI have set up toll free consulting lines to advise customers on how to establish home offices. AT&T offers a service called "Home Agent" to businesses, which routes incoming business calls to customer service agents in their homes. In a review of telecommuting opportunities, the Department of Transportation concluded that telecommunications services and equipment are currently capable of supporting most telecommuters, who use their telephones and modems to keep in touch with their offices and clients.[4] However, more advanced capabilities, including high-bandwidth connections for transporting video and high-speed data, will be needed in the future, and would be beneficial now, according to the report.

Training and Certification

Finally, businesses are using telecommunications technologies to link with educational and training institutions to provide in-house training for employees. This makes it easier for employees to keep up on advances in their specializations, and to further their career goals with minimum disruption of their ongoing work. In some cases, it is a low-cost way to meet re-certification requirements. These benefits are especially important in rural areas, because travel costs and time constraints can create barriers for rural workers and their employers. Access to high-quality employees and training at reasonable prices is one requirement that prospective businesses consider when making location decisions.

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[3]Mitchell Moss and John Carey, "The New York Telecommuting Project," undated, p. 11.

[4]U.S. Department of Transportation Transportation Implications of Telecommuting, Washington, D.C., April 1993.

Applications in Education

Education is vital to rural America. As rural economies are restructured, rural workers of all ages will need to be prepared for changes in the skills their jobs demand, and in the types of tools they will use to do their work. Computer and telecommunications technologies can help schools expand their course offerings, and offer their classes to a wider range of students. They can also play a role in "school restructuring," a movement that many educators have undertaken to redefine the processes and goals of education. Finally, information technologies can help school administrators cope with the ever-growing administrative demands of the modern school by streamlining record-keeping and managing information more efficiently.

Distance Learning

In many rural areas, providing quality education poses a difficult problem. Rural areas generally lack the tax base of more affluent urban and suburban areas, and they also have fewer students. This leaves rural school districts without the resources to provide a full range of course offerings. This problem is compounded by the fact that many states have revised their curricula and introduced tougher new standards for high school graduation, including requirements in foreign languages, mathematics, computing, and sciences. The scarcity of funds and students makes it particularly difficult for rural schools to support specialty teachers to meet these requirements.

In response to these challenges, rural schools systems and educators have begun to experiment with innovative uses of telecommunications known as "distance learning" to improve their instructional offerings without dramatically increasing costs. Distance learning techniques run the gamut from interactive bi-directional video projects, in which students and the teacher can see and hear each other from different schools, to broadcast video courses that are transmitted via satellite and allow schools to import instruction from a master instructor, to modified versions of correspondence courses using audio cassettes, compact discs, and video cassettes.

With distance learning, rural schools can offer curricula and instruction that is as rich and

diverse as that found in much larger urban schools, thereby giving rural Americans a fighting chance in today's increasingly competitive global economy.

School Re-structuring and Communication in Education

"School restructuring" and "education transformation" are terms used for a widespread movement in the education community to re-think the processes and goals of education. School re-structuring efforts range from innovations like multi-grade classrooms to wholesale changes in the structure, schedule, and format of traditional education. Common to many re-structuring efforts are a focus on student-driven learning, outside-the-classroom experiences, outcome-based evaluation methods, and reliance on new technologies to supplement traditional teaching methods.

Computers and telecommunication technologies can play an important role in school re-structuring efforts. They give students the tools to explore all kinds of information and experiences, and they widen the range and reach of traditional classroom materials. They make it possible for students to communicate more easily with students and experts from around the world, and to find other students who share their particular interests.

New communication technologies also make it easier for teachers and administrators to communicate among themselves, and with students, parents, and community representatives. Educators are very concerned about the isolation that most teachers in traditional classrooms experience. Teachers all over the U.S. are experimenting with communication via electronic mail and computer conferencing, and they are finding that these tools can help them improve their in-class activities as well as nurture them professionally and emotionally. By providing new links to parents and communities, telecommunications technologies can also help achieve a major goal of school re-structuring: making education a community-based effort in which all citizens play a role.

A key to the successful use of new communication technologies in education is the preparation of teachers and administrators to use the tools effectively. Too often funds are appropriated to purchase computers or install communication links, without setting aside adequate time and resources for teachers to devote to implementing the new tools into the

curriculum, or to re-designing the curriculum. Even more preparation is necessary when parents and other community members are to be involved. Only with attention to both technology and "preparedness" issues will educators be able to take maximum advantage of new telecommunication technologies.

Easing Administrative Burdens

Like their counterparts in business, school administrators often find themselves drowning in a sea of paperwork. Government agencies require records on every conceivable aspect of school operations, and each new in-school program brings with it new demands for record-keeping. To keep up, administrators have embraced computers and telecommunications technologies. Similar to businesses, many schools have automated their recurring data input and processing, and some have integrated their various databases into school- and district-wide information systems. In some cases, schools file records electronically with state agencies, including attendance records and daily participation in free-lunch and daycare programs.

Applications in Health Care

Rural America currently faces a dire shortage of physicians; according to some estimates, rural areas have less than half the physician coverage available in urban areas. This problem is compounded by the fact that many rural hospitals cannot afford to purchase limited-use, state-of-the-art technologies. As a result, small community facilities find it difficult to compete with larger, more distant medical centers, and they are often forced to close. Thus, rural residents must frequently travel even longer distances, without the benefit of a public transportation system, to regional health care centers. Not surprisingly, many rural residents go without treatment or preventive care until their condition becomes critical: a disproportionate number of rural people suffer from chronic illnesses.

Even more disturbing, the physical barriers to health care access may be outweighed by financial barriers. In 1992, for example, one out of every five rural families with children lived in poverty, compared to one out of every six in urban areas; rural residents below the

federal poverty level were less likely to be covered by Medicaid than urban residents.

Information technologies are being harnessed to address several dimensions of the rural health care problem: extending and promoting disease prevention; improving health care through telemedicine; improving emergency response; and supporting administrative improvements and cutting costs. In a 1992 study, Arthur D. Little, Inc. estimated that effective use of telecommunications could help the U.S. reduce its health care bill by more than $36 billion per year.[5]

Telecommunications in Disease Prevention and Health Promotion

As government, industry, and the health care sector look for ways to stem the growth of our nation's health care costs, disease prevention and health promotion are gaining a great deal of attention. It is common sense that it is much less expensive to prevent an injury or illness than it is to treat one, especially if the emotional and life-style costs of an injury are taken into account. Experts are looking for effective ways to inform citizens about health risks, and to empower them to take a positive role in their own health maintenance and treatment.

This is especially important in rural areas, where residents are older, on the average, and where they face greater risks from certain injuries (about two-thirds of motor vehicle deaths occur in rural areas, for example). Rural residents must also drive longer distances to doctors and hospitals to receive treatment, if they become ill.

Telecommunications technologies can help promote good health. We can extend the effectiveness of traditional communication formats, including broadcast public service announcements and printed pamphlets, with new technologies that gives users access to the particular information they need, when they need it, in a format they can use. Electronic bulletin boards, for example, can house large amounts of data on various medical conditions and treatments. When someone encounters a medical problem or concern, he or she can

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[5]Arthur D. Little, Inc. "Telecommunications: Can It Help Solve America's Health Care Problems?" 1992, p. 2.

access the database using a personal computer, and get the information that is needed in a way that is private and convenient.

New telecommunications technologies are also being used to make it easier for people to contact physicians, nurses, and therapists. Several electronic services now provide an "ask a professional" option, so that users can upload their questions and get a quick reply that responds to their particular concern. Some insurance companies and hospitals offer "nurse lines," simple 800 telephone numbers that give clients 24-hour access to a nurse's opinion. While such services do not substitute for face-to-face consultations, they make it easier for someone worried about a medical condition to decide whether or not to make an appointment.

At the high-tech end of health promotion applications are projects like Washington, D.C.'s "Community Services Workstation." Developed by a partnership of government agencies, telecommunications providers, universities, and social service agencies, this project will link city social and health-care providers into a single network, where they will be able to coordinate client care. Such coordination is especially important for high-risk clients, like teen-age mothers who have not yet learned how to manage their and their children's' health care needs. The project will also provide workstations in public places that can be used by clients to manage their own care and gather health-related information that they need. Projects like these are needed just as much in rural areas, where long distances and inability to pay for health care can allow some residents to "fall through the cracks" of the health care system.

Telemedicine: Remote Diagnosis, Treatment, and Monitoring

Another promising application of telecommunications and information technologies is in extending and improving health care in rural areas. Innovative applications of telecommunications known as "telemedicine" can decrease both the cost of services and the isolation of rural health professionals. Telemedicine can also increase the quality, availability and convenience of health care services available to rural Americans.

Through a system of video and data networks linking rural hospitals to regional medical

centers, rural general practitioners can consult with specialists in major hospitals across the country. Physicians and other health care professionals use such systems to access online databases of indexed scientific periodicals and for more advanced applications, such as remote diagnostics and video consultations. Where there are no doctors, rural para-professionals can communicate with physicians for assistance in diagnosis and treatment of their patients. These technologies can save rural clients from repeated long trips to urban areas, and can be used to help cut costs so that rural hospitals can remain open when they otherwise could not.

Telecommunications devices can also be used to monitor patients from their homes, which reduces hospital-stay costs and gives patients the option of convalescing at home, which many patients prefer. Such devices even allow some patients to return to work and other everyday activities, knowing that they will be alerted in time, if their health condition should require a return to the hospital.

Demonstrations with telemedicine applications have been in existence since the 1950s. Today, over 20 states have active telemedicine projects. Although all hold great potential, the promise of fully deployed telemedicine for rural areas is hampered by the lack of approved reimbursement policies for telemedicine by the federal government and by private insurers. Two current federal programs help support demonstrations of telemedicine technologies:

- The Office of Rural Health Policy, a division of the U.S. Department of Health and Human Services, has funded telemedicine projects since 1989. It has been involved in projects such as the MEDNET demonstration project, linking Texas Tech University with two West Texas rural hospitals. It also helped set up Mountaineer Doctor Television (MDTV), linking the West Virginia University Health Sciences Center with four rural hospitals to provide 24-hour video consultation, emergency assistance, and distance learning opportunities for physicians, students and nurses in rural areas. The Office plans to expand its commitment to fostering telemedicine networks in rural areas with a new $4 million grant program for telemedicine projects.

- The Rural Electrification Administration was established as part of the U.S.

Department of Agriculture to provide loans and technical assistance to rural utilities, both electric and telephone. A new component of REA's rural development program is the Distance Learning and Medical Link Grant Program. In 1993, this program awarded a total of $10 million in grants to 28 educational and medical organizations to provide advanced telecommunications technology for rural Americans.

Telecommunications and Emergency Response

Enhanced 911 (E911) systems use telecommunications technology to improve on the basic 911 service by linking telephone numbers with telephone location. In an E911 system, telephone numbers and addresses are entered into a database that allows an operator to immediately see the address of an emergency caller, including any special information regarding medical conditions or disabilities. This allows the dispatcher to send help even if the caller cannot speak or describe his/her location, and helps dispatchers identify the nearest emergency service provider. This service has particular significance in rural areas, where there may be different emergency service providers, greater distances to travel, and where the dispatchers may be unfamiliar with local place names for the entire 911 jurisdiction. E911 service is being implemented throughout the United States, but there are many rural areas that do not yet have the service.

Supporting Administrative Improvements and Cutting Costs

As experts have examined the U.S. health care system, looking for ways to cut costs, they have discovered that administrative costs comprise a high percentage of total health care costs. Given the number of institutions involved in health care provision, the laws and legal liabilities involved, and the complicated nature of medicine itself, these high administrative costs are not surprising. However, new information technologies are gradually being adopted to control these costs. Almost all $36 billion of the potential cost savings of telecommunications applications in health care predicted by Arthur D. Little, Inc., were in management of patient information and processing of health care claims.

Standards for medical and payment records are being developed, so that records can be more easily transferred, stored and updated from centralized databases. Most doctors and hospitals now submit bills directly to insurers, via telecommunications lines, and payments are made directly into providers' bank accounts. Health care providers are also linked via

electronic data interchange (EDI) to their suppliers, streamlining inventory control and payments. Arrangements like these are making it easier for health care providers to form partnerships, which federal government officials see as a key to an efficient health care system in the future.

Telecommunications technologies are also used to provide training and certification classes to health care professionals. Using the same technologies described in the previous section on distance learning, professionals can take classes and receive updates on particular procedures and equipment. This is especially helpful in rural areas, where professionals would have to drive long distances to attend classes. In some states that are experiencing shortages of nurses, distance-learning training courses have been established so that student nurses in remote communities can receive some of their classes via telecommunications.

Applications for Delivery of Public/Government Services

In vogue among government administrators is the concept of "reinventing government." In response to a long history of unresponsive bureaucracies and inefficiency, reinvention is the idea that the U.S. can create streamlined, customer-focused, responsive government agencies that are capable of re-thinking their mission and operations as new circumstances and customer needs emerge. Rural government agencies, facing declining tax bases and increasing demands for services, are especially interested in improving their effectiveness while containing costs. Telecommunications and computer technologies have a central role to play in reinventing government so that government agencies can operate efficiently and serve constituents effectively.

Improving Communication and Record-Keeping Within Government

Just like the private sector, government agencies can use computer and telecommunications technologies to streamline their operations and improve their service to citizens. Most government agencies at the federal, state, and local levels have taken advantage of computer systems to simplify record-keeping and improve the quality and accuracy of information that is collected and stored. In law enforcement, for example, the

federal government has set up systems to collect and track information on certain types of crimes and criminals, making it easier to solve and prosecute cases. The Internal Revenue Service now allows taxpayers to file their returns electronically, speeding processing and eventually cutting down on administrative costs. State and federal environmental protection agencies keep databases of licensees and violations, making it easier to track offenders and monitor clean-up. Some local governments and their regional development organizations have developed computerized maps of their areas, known as Geographic Information Systems (GIS), making it easier to record and process property sales, expedite title and deed searches, and provide planning and zoning services. At all levels of government, agencies are finding new ways to use computers and telecommunications links to streamline their operations.

Telecommunications technologies can also support communication within and among government agencies, a crucial requirement for providing high-quality service to citizens and for avoiding duplication of services. One vestige of bureaucratic organizational forms is the fact that agencies often know little about what is being done in other areas of government; cross-boundary communication was discouraged, and citizens were expected to figure out the bureaucracy in order to get their needs met. Agencies that are reinventing themselves have had to step back to get the big picture of how government as a whole is working, and they have had to begin establishing communication and cooperation among agencies and divisions. While some of this change requires cultural and attitude changes, telecommunications innovations like electronic mail and computer networks can facilitate the changes.

Improving and Extending Communication With, and Service Delivery to, Citizens

Telecommunications technologies offer government agencies a host of new ways to interact with, and serve, their constituents. Agencies have established 800 numbers to make it easier for citizens to get information and referrals, and government-sponsored electronic bulletin boards are popping up in many agencies. Some states are setting up electronic funds transfer systems for government disbursements, from welfare checks to tax returns. Some state office buildings now contain computer-based kiosks that query visitors about their needs and direct them to the appropriate offices. These kiosks can also be located in public areas like shopping malls and libraries, thereby extending the reach of government assistance to heavily-traveled public places. Libraries themselves are putting their card catalogues online,

allowing clients to search the shelves and order materials from a computer at home.

Applications like these are especially important in rural areas, which are often hours from the state capital or nearest agency office. For example, in extreme southwestern Kentucky, the Purchase Area Development District, a regional development organization serving a predominantly rural eight-county, 21-city area, is working with a local telephone company and the Economic Development Administration to establish a regional telecommunications facility, the Purchase Area Rural Telecommunications Resource Center. The center houses teleconferencing facilities that allow local elected officials and area legislators to remain in close contact with state officials without making the four and one-half hour trip to the state capital. The center also aids economic development efforts with its 24-hour online economic development database, and a Geographic Information System that provides sophisticated digital mapping technology. The Center eventually plans to link government offices, schools, public buildings, and industrial sites into a regional information infrastructure for the entire region, allowing rural residents to get the same quality of service and access to telecommunications that urban residents already enjoy.

Conclusion: Advanced Telecommunications Applications are Essential for Rural Sustainability

This section has reviewed scores of telecommunications applications that can contribute to the economic and social well-being of rural communities. These applications are helping rural organizations to improve their efficiency and effectiveness, and to expand and extend their services. With their help, rural businesses, schools, health care institutions, and government agencies can produce products and services that are competitive with those of their counterparts in urban areas.

Requirements to Realize Telecommunications Opportunities in Rural America

If telecommunications facilities are to serve as an effective economic development tool, as described in section II, rural communities face two requirements:

- A public telecommunications infrastructure that is capable of supporting advanced equipment and services at reasonable prices; and

- Community preparedness to make informed decisions about the planning, purchase, implementation, and evaluation of new information technologies.

This section explores each of these requirements, assessing rural communities' current circumstances and the prospects for meeting these requirements in the future. If rural communities are to remain competitive, it is essential that both requirements be met: an advanced infrastructure is an essential tool of economic development, but without the knowledge and motivation to use it, it is ineffective. We focus on these joint requirements, rather than choosing the traditional "technology-push" or "demand-pull" approaches to telecommunications investment.

To illustrate the point that the two requirements are inter-dependent, Table 1 lists some example services, and the infrastructure and preparedness requirements that go with them. We begin with services, because in a market-driven industry, it is telecommunications providers' anticipation of a market for various services that leads them to invest in infrastructure.

The Public Telecommunications Infrastructure in Rural Areas

What kind of telecommunications infrastructure does rural America have now? It is impossible to answer this question with a single description, because rural infrastructure varies widely from community to community, and because most telecommunications data do not differentiate rural and urban communities, per se. We will begin with a general description of telecommunications providers in rural areas, and then move to some specifics about the infrastructure.

Rural Telecommunications Providers

Telecommunications infrastructure is provided by a combination of companies:

- Local telephone companies own and operate the "local exchange network," which connects most homes and businesses in the U.S. to "central office switches" that route calls across town, across the region, or to a long-distance carrier.

- Long-distance companies own and operate "interexchange networks," the long-distance networks that complete calls going from one local exchange to another.

- Cellular telephone companies operate cellular systems, carrying calls between cellular telephones and the local exchange network.

- Personal communication networks (PCNs) allow mobile communication, similar to cellular systems, but with a different set of technologies, so that mobile telephones are very small and light. PCNs are in initial stages of deployment, mostly in urban areas.

- Competitive access providers (CAPs) are companies that connect individual customers directly to long-distance networks, thereby "bypassing" the local exchange network.

- Data network providers give customers local access (ie., without a long-distance charge) to world-wide data networks, allowing them to connect to electronic information services and remote computers at transmission speeds and/or prices that are more favorable than using local and long-distance telephone networks.

- Cable television companies operate local coaxial cable networks, most of which provide one-way transmission of video signals from cable "headends" to subscriber households. Some systems have a two-way capability, but the subscriber-to-headend channel is usually very narrow bandwidth, used for ordering pay-per-view programs.

There are approximately 1,330 local telephone companies in the U.S., serving about 145 million switched access lines.[6] The seven Bell Regional Holding Companies (RHCs) serve most of the nation's cities and larger towns, accounting for about 109 million access lines. The other local telephone companies are referred to as "independents," most of whom serve smaller, rural areas. The exception is GTE, a large holding company with about 14.7 million access lines, similar in size to a Bell RHC. The largest local telephone companies (the 54 companies with over $100 million in annual revenues) account for 133 million access lines, leaving the remaining 1,275 companies to serve approximately 12 million access lines.

Until recently, many rural areas were served by a single long-distance carrier, usually AT&T. The FCC has now mandated "equal access," which means that local telephone companies must make the technological changes necessary to allow other long-distance carriers to compete for rural subscribers' long-distance business. At the end of 1991, equal access was available to about 97% of Bell company access lines, 87% of the other large telephone companies' access lines, and 35% of the smaller telephone companies' access lines.[7]

Cellular telephone service has exploded in the last ten years, and cellular franchises have been awarded for almost all geographic areas of the U.S. Most large cities now have cellular services in operation, and many rural franchisees are in the process of setting up such services. In Nebraska, South Carolina, and Minnesota, local telephone companies have formed various types of partnerships to organize and construct rural cellular networks for their states.

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[6]Data in this paragraph are for 1992, from Federal Communications Commission, Statistics of Communications Common Carriers, Washington, D.C.: U.S. Government Printing Office, 1992-1993).

[7]Federal Communications Commission, Statistics of Communications Common Carriers, op. cit., p.308

Example Services	Infrastructure Requirements	Where Needed?	Community Preparedness Issues
Custom-calling features: call-waiting; last-call ringback; speed dial; call-forwarding	Digital switching	All central office switches	Customer awareness
Voice mail	Digital switching	All central offices	Customer awareness
Video teleconferencing	Fiber optic cable digital switching;	Schools, hospitals, govt. buildings, public teleconferencing facilities	Training to use equipment; curriculum development; initial project setup costs; ongoing operations & maintenance budgets
Dial into electronic bulletin boards or remote databases	"Clean" lines	Throughout local & long-distance network	Customer awareness; training; access to computers & modems; subscription costs
Cellular telephone service	Transmission sites & central office linkages	Throughout service area	Budget for equipment & usage charges
Private data lines	"Clean" lines with digital switching	All central offices	Budget for equipment and usage charges; training; design, planning, & implementation; privacy & security
E-911 services	Digital switch; SS7 (a software conversion)	All central offices	Public Awareness

Table 1: Telecommunications Services and Their Infrastructure and Preparedness Requirements

Today, competitive access providers are a predominantly urban phenomenon. These companies are attracted to urban markets, where businesses that can benefit from their services are concentrated. CAPs are gradually working into rural areas, as well, however, usually serving communities' largest businesses, educational institutions, or government agencies.

Data networks have established local access numbers in most large cities of the U.S. This gives urban customers access to data connections around the world, under favorable rate structures. A rural caller, however, must pay the by-minute toll charge to reach the data network, in addition to the data network charges being paid by the urban customer.

How Does the Rural Telecommunications Infrastructure Match Up?

Rural telecommunications infrastructures, just like rural communities, are very diverse. Some rural areas enjoy very high levels of service, with access to telecommunications facilities that are on par with urban areas. Other rural areas lack advanced services, and a few lack even the basic telephone facilities that most Americans take for granted. From a development perspective, it is important to recognize this diversity. We need to upgrade those rural areas that have fallen behind, facilitate the continued deployment of advanced services in all rural areas, and promote the high-quality infrastructure that many rural areas already have in place.

Perhaps the most popular misconception about rural telecommunications infrastructure is that it is uniformly backwards in comparison with urban infrastructure. In reality, many rural areas enjoy high levels of telecommunications service, and have access to capabilities very similar to those available in urban areas. In Minnesota, for example, all but one percent of the access lines served by the smallest telephone companies (those with less than 1,000 access lines) were served by digital central offices in 1992. In the Minneapolis/St. Paul metropolitan area, by contrast, 43% of the access lines were served by analog-electronic switches, and 57% by digital switches, in 1993.[8] Table 2 shows the percentages of access lines served by

[8]Minnesota TeleFutures Study Group, Final Report to the Minnesota Public Service Commission, November, 1993, pp. 8-9.

digital switches and equipped with SS7 technology, for several larger telephone companies.

Local Exchange Company	% of Digital Access Lines	% of SS7 Access Lines
Bell Companies		
Ameritech	74%	55%
Bell Atlantic	63	95
US West	45	54
Large Independents		
Centel	100	72
Century Telephone	82	13
GTE	83	30
TDS Telecom	94	0
Small Independents		
NECA interstate access tariff participants	91	15

Table 2: Telecommunications Infrastructure Upgrades in Large and Small Telephone Companies, 1992[9]

While this example helps illustrate the quality of the infrastructure in some rural areas, it also illustrates the difficulties of comparing rural and urban infrastructure. While digital switching is often used as a mark of a well-developed infrastructure, it is unfair to jump to the conclusion that the Twin Cities metro area is poorly served, because there are software upgrades that can be made to analog electronic switches (most of which have been deployed by Bell Operating Companies) that give them functionality similar to digital switches. It is also difficult to make rural/urban comparisons because most telecommunications data is not collected according to rural/urban distinctions.

With these caveats in mind, however, it is important to recognize that there are some rural areas that still lack the telecommunications infrastructure that most Americans rely on. These areas are often served by older, mechanical central office switches that are not

[9]NECA interstate access tariff participants include 1,194 small, rural telephone companies that served 7 million access lines in 1993. Data for this table is from Carol Wilson, "LECs Gear Up for Competition," Telephony, vol. 224, no. 4, 1993, p. 38; and National Exchange Carriers Association, "Building the Telecommunications Infrastructure in Rural America," 1993, p. 4.

programmable and that support few modern services like touch-tone dialing, E911, or custom calling features. The lines that connect customers to these switches have reached their capacity, forcing customers to share "party lines" and making it difficult to use modems to access databases. Even more disadvantaged are those few rural communities that have no access to telephone service at all. Some of these unserved or under-served communities are very remote; most of them are also in very low-income areas.

In section I, we looked at some of the reasons for rural/urban disparities: the more concentrated telecommunications markets in urban areas, shifting cross-subsidies that make investment in rural infrastructure more difficult, and barriers to the diffusion of telecommunications equipment and services among rural customers. The first reason applies mostly to the larger local telephone companies that serve both urban and rural areas; their focus is on their urban markets, which are experiencing the most competition. The second and third reasons apply to both large and small companies, who are finding rural investment capital harder to come by, and who are facing rural customers who are by-and-large not yet prepared to demand, purchase, and implement telecommunications-based technologies.

Prices In Urban and Rural Areas

In general, rural residential telephone customers have somewhat smaller total bills for local phone service than do their urban counterparts. In Wisconsin in 1990, for example, the average local residential rate in small exchanges (less than 2,000 access lines), was $9.14; in large exchanges (more than 25,000 access lines), the rate was $14.01. The same relationship can be seen among various degrees of "rural." REA borrowers include approximately 900 small, rural telephone companies that have received low interest loans from the Rural Electrification Administration. The average revenue per subscriber for these companies in 1991 was $149.75 for local telephone service (and $466.68 for toll and access charges). For the smallest REA borrowers, those with less than 500 customers, the local service average was lower: $137.77 for local service (and $573.44 for toll and access charges).

Overall, the average urban household spent about $621 for telephone service in 1991, and the average rural household spent $601. While the rural households spent less, the fact that rural households have less total income than their urban counterparts meant that they

spent a larger percentage of their total income on telephone service: 2.4%, compared to 2.0% in urban areas.

There are several reasons for these smaller bills. Rural residents often don't have access to advanced calling services (call waiting, caller ID, etc.) that urban consumers have. In addition, the sources of income in urban and rural telephone companies are distributed quite differently. Local telephone companies make money in four main categories: local telephone service, toll charges, access charges (charged to long-distance carriers for carrying long-distance calls through the local network), and miscellaneous income from other sources. The distribution of these sources varies among companies, with small, rural companies getting more of their income from access charges, and larger telephone companies relying more on local telephone service and toll charges. While there is not good data available to make clean comparisons among urban and rural telephone companies, it is safe to assume that companies' reliance on various revenue streams is not uniform, and that shifts in cross-subsidies and market boundaries are likely to affect rural and urban companies differently.

Telecommunications Preparedness

> "There is an educational disconnect between the rapidly developing communications technologies and information resources available to the public, and the public's ability to use these resources."[10]

If telecommunications is to be used as a productive economic development tool, rural communities require not just an advanced telecommunications infrastructure; they must also be prepared to use that infrastructure effectively. We call this "telecommunications preparedness," and we consider it every bit as important as the nature of the infrastructure itself. Without it, even the most advanced infrastructure will lie fallow and unused; with it,

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[10]Charles R. McClure, "Network Literacy in an Electronic Society: An Educational Disconnect?" in The Knowledge Economy: The Nature of Information in the 21st Century, the Annual Review of the Institute for Information Studies, 1993-1994, p. 137.

even the most basic facilities can be used to improve rural competitiveness and quality of life. As rural customers begin to see the advantages of new technologies, and begin to implement them effectively, they drive the introduction of additional services and upgrades of the inf structure.

There are several dimensions to telecommunications preparedness. The first involves awareness and understanding--making sure that rural families, businesses, schools, hospitals, and government agencies know what types of telecommunications services are available in their community, and how these services can be applied. A small business owner, for example, might worry about missed telephone calls, without being aware of the availability and costs of potential solutions to the problem like call forwarding, call waiting, or a second telephone line.

A second dimension of telecommunications preparedness is the ability to implement new services and equipment effectively. Rural business owners and administrators may require consulting and technical assistance in the planning, design, implementation, and evaluation that accompanies the adoption of new technologies. They may also need forums for discussion of cooperative projects and joint solutions to common problems, from equipment-sharing to seminars on privacy and security concerns.

A third dimension of preparedness involves budgets. To implement new telecommunications technologies, rural communities need access to adequate capital financing and other forms of funding. Many studies have identified such access as one barrier to economic growth in rural areas.

A fourth dimension of preparedness involves the integration of telecommunications-related strategies with the larger economic development strategy of a community or region. These applications will have a greater chance of success if they are part of a comprehensive development strategy. A community that has assessed its strengths and weaknesses and devised a targeted strategy for development will be in a good position to deploy telecommunications innovations as one tool in that strategy. In order for this to happen, however, there must be means for integrating community- or region-wide

telecommunications planning with more general economic development planning.

All of these dimensions require attention in rural communities. If rural areas are to use telecommunications technologies to improve their competitiveness, we must find ways to help prepare them to use telecommunications effectively.

Universal Service in Rural America

In the Communications Act of 1934, the following language appears as the Act's purpose under Title I:

> "For the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, as far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges..."

This is the primary legislative reference that has guided the nation's programs and regulatory structure governing "universal service." Universal service means universal access to basic telephone service. In general, these policies kept rates for local residential telephone service low by relying on cross-subsidies from long-distance service and business telephone customers. The policies also included rate-averaging, which meant that all subscribers paid about the same amount for comparable service, regardless of the actual costs of providing that service in different regions.

Universal Service Policies and Telephone Penetration

Prior to 1984, universal telephone service for residential customers was promoted via internal subsidies within AT&T, a large regulated monopoly, and through regulation of revenues of the independent telephone companies serving mostly rural areas. The break-up of AT&T precipitated major changes in the implementation of the universal service objectives, because the former AT&T local telephone customers were now served by 22 Bell Operating Companies.

Today, universal service is implemented through a complicated system of transfers that keeps basic residential telephone rates low. However, increasing competition and industry restructuring are bringing changes that threaten to radically alter the manner in which universal service policies are implemented. The major elements of current universal telephone service policy and the major issues under consideration are described in Table 3.

Table 3: Universal Service Policies in the U.S.

Universal Service High Cost Funds (USF). The USF was established by the Federal Communications Commission in 1984 to subsidize telephone providers in high-cost areas, primarily rural companies. Money for the USF is collected from major long distance carriers and administered by the National Exchange Carriers Association. Funds are used to keep rates low and help pay for system upgrades and extensions to previously unserved areas. The USF has grown with the need to increase the capacity and improve the communications infrastructure in rural communities. In 1994 it is estimated that over $741 million will be distributed to local phone companies via the USF.[11]
Lifeline Assistance Programs. Low-income residential subscribers are assisted through the Subscriber Line Charge Waiver, Link-Up-America, and similar programs in many states. Like the USF, money for Lifeline programs is collected from long distance carriers and administered by NECA. Each state's public utility authority sets policies and guidelines governing the specific program in that state. Most states participate in some form of Lifeline program, with over $110 million from the national program distributed nationwide, and states supplementing with additional funding. The program reduces the cost of installing and maintaining basic phone service for eligible customers.
Rate Averaging. When local telephone companies file tariffs with the state public utilities commission they must maintain the same rate for residences located throughout large geographic areas. Therefore, customers living many miles from the switching offices pay the same price for service as do customers next door. This policy reallocates the actual costs across all consumers and helps to lower the costs of service for customers living in more remote areas.
Internal Cross-Subsidization. As regulated utilities, local telephone companies are restricted to price caps or approved rates of return on their investments, determined by each state's public utility authority. Some services, such as the access fees charged to long distance carriers and the toll services charged to residential subscribers, are priced above cost. Revenues from these services hold down the cost of basic residential service. In addition, local phone rates are averaged across all of the company's subscribers, both urban and rural, which subsidizes high-cost rural customers. Local telephone companies' "carrier of last resort" status requires them to provide service to anyone living in their service territory, at the averaged rates, regardless of the actual cost of providing local service. The actual amount of these cross-subsidies is open to debate, but a recent study commissioned by the United States Telephone Association estimated that they might total as much as $20 billion.
Rural Electrification Administration Financing. Since 1949, the federal Rural Electrification Administration (REA) has maintained a telephone loan program "to furnish and improve telecommunications services in rural areas." REA has provided low-interest loans to approximately 950 borrowers.

[11] Source: National Exchange Carrier Association

For rural America, universal service policies have been critical in maintaining basic telephone communications. In rural areas, large geographic distances and low customer densities raise the cost of providing phone service and limit demand and economies of scale. The national average for phone service is 50 telephone customers per route mile; for rural local phone companies, the average is 6 customers per mile.[12] The number of business customers in rural areas is also lower, which impedes the ability of rural local phone companies to cross-subsidize residential rates with higher charges to business customers. An average of 32% of the large phone companies' access lines are business lines; for rural phone companies, the average is 14%.[13]

The results of universal service policies in the United States have been quite impressive. In 1940 only 37% of all households had telephone service. By 1960 this rose to 78%, and today approximately 94% of all households in the United States have telephone service. Table 5 shows the actual telephone penetration by state.

Although they have helped the U.S. achieve its national average of a 94% telephone penetration rate, universal service policies and programs have not yet brought basic telephone service to all rural households. For example, 95% of farm households possess telephones, slightly above the national average. However, in communities with populations between 50,000 and 250,000, the telephone penetration rate drops to 93%. For those living in communities outside of any metropolitan statistical area, penetration drops to 90%. For households on Indian reservations, the penetration rate is approximately 80%.

Challenges to Universal Service Policies

Rural America, as a primary beneficiary of universal service policies, has the most at stake in its future. The past year has witnessed an explosion in federal, state, and private

[12]Presentation by Arland Hocker, TDS Telecom, to NARUC staff, Subcommittee on Communications, San Francisco, CA, July 23, 1993, quoting 1990 statistics from the United States Telephone Association and Rural Electrification Administration.

[13]Presentation by Arland Hocker, op. cit.

industry activities that will affect the future of local phone service in rural America. Local phone service monopolies face increasing competition from cellular, cable, electric utility, and competitive access providers, especially in high-density metropolitan centers. Some Bell companies are selling off their smaller rural exchanges as costs go up and investment returns are greater in other markets. This urban focus means that even when rural businesses located in areas served by large telephone companies are big enough to economically justify the delivery of advanced services, they are often the last to be served. Independent telephone companies are also concerned, as competition from competitive access providers (CAPs) threatens their ability to subsidize local service with higher-than-cost access charges to long-distance carriers.

These changes have affected all elements of universal service, by threatening to undermine the subsidy pricing system that has made basic telephone service in rural areas affordable. The growth of the Universal Service Fund (USF) has led to calls for funding of the USF to include all providers of telecommunications, including new entrants. Some have also called for channeling assistance to high-cost areas directly to customers, rather than to the phone companies that serve them. It has also been suggested that local companies receiving funding must commit to significant cost reductions and limitations on the level and type of services to be subsidized.

Lifeline programs directly assisting low income customers will probably continue in the future, but the method of collecting revenue may have to change. Some advocates are calling for all telecommunications providers to contribute to funds, and others say that such programs should come from state general funds, similar to other welfare programs, rather than being borne by the telecommunications industry itself.

The future of internal industry cross-subsidies and rate averaging are also uncertain. Competition for local telephone service decreases local phone companies' ability to provide service to customers in high-cost areas, when the more lucrative customers are being picked off by competing firms.

State	Percent of Households with Telephones	Total Access Lines	Percent Access Lines Served by Bell Company	Percent Access Lines Served by Independents
Alabama	90.8%	1,949,760	80.6%	19.4%
Alaska	91.7	307,637	0.0	100.0
Arizona	93.3	1,963,251	94.1	5.9
Arkansas	87.3	1,113,610	67.9	32.0
California	95.6	17,674,860	77.7	22.4
Colorado	95.5	1,972,972	96.1	1.9
Connecticut	96.6	1,861,979	0.0	100.0
Delaware	96.5	414,319	100.0	0.0
District of Columbia	88.7	793,666	100.0	0.0
Florida	93.5	7,821,041	60.3	39.7
Georgia	90.2	3,502,709	83.9	16.2
Hawaii	95.3	573,717	0.0	100.0
Idaho	93.0	509,181	76.0	24.0
Illinois	93.8	6,492,357	82.5	17.6
Indiana	91.9	2,795,157	61.4	38.6
Iowa	95.4	1,396,588	65.4	34.5
Kansas	95.2	1,304,281	83.1	16.9
Kentucky	89.6	1,682,973	58.5	41.3
Louisiana	91.7	2,002,874	92.9	7.1
Maine	93.2	667,154	83.9	16.1
Maryland	96.0	2,801,616	99.8	0.2
Massachusetts	96.8	3,656,319	99.9	0.1
Michigan	94.4	5,055,103	84.6	15.4
Minnesota	96.7	2,387,736	75.4	24.5
Mississippi	86.3	1,076,418	93.9	6.1
Missouri	94.0	2,723,404	75.3	24.7
Montana	93.2	419,027	77.6	22.4
Nebraska	96.4	852,80	54.4	45.6
Nevada	93.7	602,650	29.2	70.8
New Hampshire	93.4	652,568	93.9	6.1
New Jersey	95.4	5,075,634	96.9	3.1

New Mexico	94.4	717,830	85.5	14.5
New York	88.4	10,506,130	90.3	9.8
North Carolina	92.5	3,520,588	50.1	49.9
North Dakota	95.8	339,969	72.3	27.7
Ohio	94.6	5,496,830	59.0	41.0
Oklahoma	90.9	1,598,653	82.4	17.6
Oregon	93.9	1,541,960	68.9	31.1
Pennsylvania	96.9	6,637,072	77.4	22.6
Rhode Island	94.8	548,854	100.0	0.0
South Carolina	89.2	1,678,893	67.7	32.3
South Dakota	94.1	346,286	77.3	22.7
Tennessee	93.1	2,586,805	80.6	19.4
Texas	91.5	8,882,180	77.6	22.5
Utah	95.9	803,198	96.0	4.0
Vermont	94.2	318,616	85.2	14.8
Virginia	94.8	3,393,229	76.5	23.5
Washington	96.0	2,763,772	70.8	29.2
West Virginia	89.3	804,376	83.5	16.5
Wisconsin	97.0	2,648,437	66.2	33.8
Wyoming	92.7	241,467	92.0	8.0
TOTAL U.S.	94%	137,678,691	76.9	23.1

Table 4: Telephone Penetration and Providers, By State, 1992[14]

Current federal funding for the Rural Electrification Administration program is intact but subject to constraints facing all publicly-funded programs. Some advocates are calling for increases in REA's appropriations, to cover loans for upgrades to the rural telecommunications infrastructure.

[14]Second column indicates percentage of households with a telephone available within the housing unit. From "Telephone Subscribership in the United States," Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, Alexander Belinfante. July, 1993. Access line information is from Table 2.3, "Total Presubscribed Lines for All Local Exchange Companies As Of December 31, 1992," Communication Statistics of Common Carriers, op. cit.

Redefining Universal Service: An Advanced Infrastructure For Rural America

At the same time that policy makers are looking for ways to protect universal access to basic telephone service, many advocates are calling for new definitions of basic service that will go beyond single-party lines, "clean" lines and touch-tone dialing. Some advocates are calling for basic service to include interactive voice and video services to the home. The expansion of these services are already underway in a few urban communities, and the costs of such expansions can be high, as much as $2,000 per subscriber. Without significant assistance and new policies, rural areas will certainly lag significantly behind urban areas, because customer densities are lower and the costs of providing service to each customer are higher. However, if rural communities are to be competitive, they will need more advanced services, like those in urban areas, and they will need them at the same time that urban areas get them.

The prospect of upgrading our definition of basic telephone service to include more advanced capabilities intensifies all of the issues discussed in the previous section. It will be difficult to decide what should count as basic service, when some customers are satisfied with what they already have, and others want new services. It will also be difficult to draw up budgets for upgrades, and to determine where the money for upgrades will come from. Finally, questions of whether, and how, to regulate new services will arise. These issues are especially pressing for rural communities, who will need modern facilities to remain competitive.

Conclusion: Universal Service Policies Are Critical to Rural America

The policies and programs described in this section have led to this country's success in bringing modern telephone service to almost every household. Rural consumers have benefitted by the various mechanisms, programs, and policies that make up America's commitment to universal service. However, there are many challenges facing the components of universal service. In the future, the nation must continue this commitment. National and local leaders of rural America must actively protect this vital national policy and make their views known to policymakers.

Recommendations

Managing change in the nation's telecommunications infrastructure and marketplace presents a daunting challenge. Traditional industry boundaries are crumbling, and users of telecommunications equipment and services are becoming increasingly diverse in their needs. The industry is becoming more and more competitive, and regulation has not kept up with technological and market changes. New players continue to enter telecommunications policy debates, and as the stakes go up, policy compromises are increasingly elusive.

This environment presents unique challenges to rural America. Fundamental policies affecting communications in rural areas are called into question. The consequences of these changes could prove detrimental to rural consumers, and therefore policymakers and advocates must take into consideration the unique needs of rural America. It is also in this environment that we must craft strategies to harness telecommunications as a rural development tool.

Economic development professionals can play a key role in these discussions by clearly articulating the importance of telecommunications in economic development strategies, and by helping to set goals for our nation's telecommunications infrastructure. We have already identified two overall requirements for the effective use of telecommunications as an economic development tool in rural America: the availability of an advanced telecommunications infrastructure, and the preparation of the rural communities to use this infrastructure effectively. From a rural economic development perspective, we see four goals that need to be achieved:

1. **Comparable Service Delivery: The telecommunications infrastructure in rural communities should support services that are comparable in quality, availability, and cost to those provided by urban infrastructure.**

2. **Community Preparation: Rural communities should be familiar with the types of telecommunications services available in their community, and have the skills to plan for, implement, and evaluate new services and equipment effectively.**

3. **Access to Funding and Financing: Rural communities should have access to adequate capital financing and other forms of funding for telecommunications-related equipment and services.**

4. **Economic Development Strategy: In each rural community, telecommunications-related development strategies should be integrated with the larger economic development strategies of the community and region.**

In this section, we will recommend paths of action for telecommunications policy makers, the telecommunications industry, and economic development professionals that will help rural America achieve these goals.

Recommendations for Assuring an Adequate and Affordable Telecommunications Infrastructure

Telecommunications policy makers at the state and federal levels are currently making decisions that will affect today's and tomorrow's telecommunications infrastructure. In this section, we will review issues regarding the affordability and features of the public telecommunications infrastructure, and make recommendations that will help assure that all Americans have access to the telecommunications facilities they need.

Competition in the Telecommunications Industry

Many of these recommendations grow out of our recognition that the days of local monopoly telephone service are almost gone. We recognize that the new era of a competitive marketplace is in the best interest of the American consumer. Competition in the telecommunications industry is bringing new technologies, improved service, and lower prices to consumers of telecommunications products and services.

We strongly embrace competition as the basic mechanism for managing the telecommunications industry, and believe that competition can be implemented so as to encourage private investment in rural infrastructure. We believe that regulators should remove existing barriers to competition among current and prospective telecommunications providers. Among the barriers to be removed are the laws and regulations that prevent local and long distance telephone and cable companies from entering each others' lines of business, and the judicial restrictions that keep the Bell Operating Companies from manufacturing equipment and providing long-distance and other communications services. In general, policy makers should consider allowing each industry to enter these new markets at the same time and without penalty.

We understand, however, that these barriers were initially set up to protect consumers, and we believe that policy makers should continue to protect consumer interests in the competitive marketplace. This is especially true in rural areas, which may require special attention in order to receive the same level of services available in urban areas. For example, careful consideration should be given to the potential effects of new competition on local telephone service in rural communities. Appropriate safeguards, such as timing the implementation of new universal service mechanisms to occur before allowing competition for local telephone service, should be implemented.

Maintaining Affordable Rates

One of the most important elements in maintaining affordable rates for rural areas has been the long-standing policy of rate averaging, which has kept telephone rates in rural and urban areas comparable. It is in the best interest of rural areas that this policy be continued. This is not just a subsidy to rural America. The value of the telecommunications network depends upon its connectivity to all parties, and it is in the entire nation's interest for our public telecommunications network to connect all households.

However, we understand that, given a competitive marketplace for local telephone service, such rate averaging is in jeopardy. Therefore, additional strategies will be needed to assure that telephone service in rural areas remains affordable. Such strategies should include the following.

a. Bringing Down Long Distance Costs

Rural consumers make far more long distance calls within state than their urban counterparts, because calls to local businesses, schools, and government agencies are often toll calls. In addition, rural residents' calls to link to the information superhighway often require toll charges, while urban callers can make local calls to access the Internet and other electronic services. We need telecommunications policies that assure that rural callers are not unduly penalized for making calls to schools, businesses, and agencies that urban residents can reach with a local call.

We therefore believe that policies to increase competition for long distance toll calls within the surrounding areas (known as "intraLATA") as well as within the state (known as "interLATA, intrastate") should be adopted as soon as possible. If both local and long distance companies compete to carry these calls, we believe that such new competition can effectively lower rates for rural consumers. We also believe that policies supporting "extended area service" should be pursued in all states, and encouraged at the federal level.

b. Universal Service Funds

The Universal Service Fund is a critical tool to help achieve the goal of extending basic communications to the entire country. Money from the fund has been essential in supporting the deployment of rural telecommunications infrastructure at affordable rates. The universal service programs, including the high cost fund and Lifeline programs, must continue. In addition, we believe that universal service programs should be funded from contributions from all providers of telecommunications services. We recommend that the FCC and state public utility commissions, with input from the telecommunications industry and public interest groups, work together to develop a specific plan for funding mechanisms that would include all providers.

Maintaining Parity in Telecommunications Services

Our second objective for the future of telecommunications is keeping rural services on par with those available in urban areas. We believe this should be accomplished in several ways.

a. Defining Basic Service

What constitutes basic telephone service is an evolving concept. However, we believe that state and federal policy makers should commit to achieving universal access to an initial set of basic telephone service in every community in America, regardless of locatio. or income level. This initial set of basic services should include:

- single-party service
- touch-tone dialing
- line quality suitable for reliable data and facsimile transmission
- E911 service
- local (no toll charge) access to electronic gateways
- access (for additional fee) to high-capacity private lines

This will require attention to the particular circumstances of each community, or even each household, that is underserved. Several programs might be needed to address the variety of circumstances that keep households from having telephone service.

Since the definition of basic services is likely to change, state and federal policy makers should establish joint and coordinated efforts to upgrade the definition of basic service over time. Policy makers should design a process for gathering input from telephone customers, and for ascertaining when a particular telecommunications capability has become essential for functioning productively in society. At the same time, the costs and funding mechanisms for each additional feature should be assessed and reviewed. This whole process should be undertaken by a joint commission made up of representatives from the FCC, state utility commissions, telecommunications providers, and large and small telecommunications customers including rural representatives.

b. Infrastructure Sharing

In some rural areas, it may be prohibitively expensive to upgrade the telecommunications infrastructure to provide advanced services, especially if there are only a few customers who desire those services. Policy makers should support policies and partnerships among telecommunications providers that may make advanced service provision

easier in these circumstances. For example, telephone companies with advanced technologies could be required to make that equipment available to other telephone companies, with less advanced equipment, so that rural customers could get the advanced services they need.

c. Alternative Regulation

Policy makers should identify specific service objectives for basic telephone provision (service offerings, price, service quality, and penetration rates), and set milestones for continued infrastructure improvements, in both urban and rural areas. As long as telecommunications providers continue to meet these objectives within their service area, they should be given flexibility over their operations and prices for non-basic services. The role of regulators in this competitive marketplace should be to: 1) work with the telecommunications industry and its customers to formulate service objectives and infrastructure milestones; 2) engage in ongoing analyses to assure that objectives and milestones are met; 3) facilitate partnerships, compromises, and cross-education between the telecommunications industry and consumers.

Recommendations for Preparing Communities to Use Telecommunications Equipment and Services Effectively

While there are probably many ways to help communities prepare for the information age, our focus as an economic development association is on economic development planning and programs. Using telecommunication as an economic development tool will require partnerships among communities, telecommunications providers, and economic development professionals. These partnerships will make it easier to prepare rural communities to use telecommunications facilities effectively, and will improve the understanding of the role of telecommunications in economic development.

a. Economic Development Strategies in Rural Areas

From an economic development perspective, telecommunications infrastructure and telecommunications preparedness are two of the many factors that will help determine the

competitiveness of a rural community. The quality of businesses, schools, hospitals, local governments, and the environment are all critical factors in rural economic development. Without a solid foundation and a strategy that addresses both economic and social issues in rural America, economic development cannot be self-sustaining.

One reason that telecommunications is receiving so much attention from those involved in economic development is that it supports such a variety of development strategies. Striving to upgrade telecommunications infrastructure and preparing rural communities to use that infrastructure effectively are activities that can fit within any number of larger development strategies, from business retention and expansion to international marketing, to business attraction.

A key to the success of telecommunications-related strategies is the degree to which they are linked to a larger program for comprehensive economic development in a particular rural region. Failure to develop comprehensive development strategies can lead to piecemeal activities that drain the energy and resources of rural communities and leave citizens disaffected or actually further behind their urban counterparts.

Not only should development activities be part of a comprehensive program; they should also be locally-based and focused on projects that local citizens themselves have identified and designed. Whatever the larger national interest in a strong rural America, the people directly affected are those living and working in rural areas. If rural education is to be strengthened, rural jobs created, and rural health care improved, these changes will happen because rural citizens are motivated and have the skills necessary to make rural development succeed.

However, local communities in most rural areas do not have the leadership or technical knowledge to put together comprehensive development plans in general, or information technology plans in particular. Rural town and county governing bodies typically focus on more traditional infrastructure needs, such as roads, schools, fire/medical facilities, water, and sewage. Many rural jurisdictions are hard pressed to meet even these basic needs, and do not have the staff or resources to undertake a broad-based economic development

program. In sharp contrast, most urban and suburban jurisdictions have fully-staffed and funded economic development departments.

To bridge this gap, a network of regional organizations was established in the late 1960s, primarily through the efforts of the Economic Development Administration (EDA) and the Appalachian Regional Commission (ARC), to assist rural governments with planning, technical assistance, and small business financing. These regional development organizations provide elected officials, who usually serve on a part-time basis and have no staff for economic development, with professional assistance. Following a public-private partnership approach, regional development organizations are a mechanism for local governments, businesses, and citizens to join together and take action to improve the economic conditions of their region. We believe that regional development organizations can help integrate telecommunications strategies into comprehensive economic development planning, by coordinating among telecommunications providers, rural communities, and telecommunications policy making at the state and federal levels.

Because regional development organizations have a great deal of experience with infrastructure planning, and because they have well-developed professional connections with local leaders and state and federal assistance programs, they are in a good position to integrate telecommunications strategies within ongoing economic development planning. Existing programs through EDA and ARC provide funds to regional development organizations for such strategic planning and technical assistance. Using these funds, regional organizations could work with rural communities, for example, to help aggregate demand for a particular set of services, creating a market that telecommunications providers could then serve profitably. Such activities would fit within regional development organizations' ongoing planning and assistance services.

This type of assistance is especially needed because the structure of telecommunications policymaking is somewhat at odds with locally-based development planning. Most telecommunications policies are made at the state and federal level; few local communities get involved in these processes, which can be very arcane and confusing to the newcomer. However, telecommunications policy makers are increasingly in need of input

from various user segments, especially residential consumers, small businesses, and rural administrators and government officials. Regional development organizations could help facilitate such input, providing communication channels between telecommunications policy makers and the "front lines" of rural businesses, schools, health care, and government agencies.

Regional development organizations could also facilitate telecommunications preparedness in rural areas, working with local telecommunications providers, schools, businesses, technical assistance programs, and government agencies.

Recommendations for Integrating Telecommunications Into Economic Development Activities

a. Improve Communication Between Telecommunications Companies and Economic Development Professionals

Most telephone companies are involved in local economic development activities, both as funders and as community leaders. This is especially true in small independent telephone companies, whose managers usually serve in local development organizations, school and hospital boards, and other leadership positions. Larger telephone companies have departments of economic development that assist local leaders within their service area in development planning, business retention and expansion, and industrial recruitment. Oddly enough, however, most telephone company activities in rural development have not been specifically telecommunications-related, but have instead focused on the overall economic circumstances of the community (employment, social services, infrastructure, etc.). It is now time to change that stance, and for telecommunications providers to help local economic development professionals understand telecommunications and its role in development.

We can start by facilitating communication between telecommunications companies and economic development professionals. Economic development organizations should invite local providers to meetings to talk about their products and services, about trends in

the telecommunications industry, and about plans for the local telecommunications infrastructure. The telecommunications industry should extend similar invitations to regional economic development agencies, so that providers can understand in more detail the economic challenges facing their local service areas, and begin to formulate joint solutions and assist in strategic planning to solve some of those problems.

b. Educate Rural Communities About Telecommunications Applications

Both economic development organizations and telecommunications providers should undertake programs that would help people understand telecommunications technologies and applications. These could include demonstration projects, funding to schools, hospitals and governments for telecommunications-based projects, and educational programs in schools, universities, and community service organizations. Telecommunications providers and economic development professionals should work together to incorporate telecommunication education into primary and secondary education, universities, and vocational education programs, so students coming out of these schools know about telecommunications applications and their impacts.

These programs can occur at the local, regional, and state levels. The town of Aurora, Nebraska, for example, recently formed an Information Technologies Task Force, made up of local leaders (including telephone company managers). The Task Force held a half-day information technology conference, which demonstrated teleconferencing facilities and other telecommunications applications, and drew 175 residents for speeches from people around Nebraska who had successfully implemented such applications.

Special attention should be paid to educating economic development professionals themselves about telecommunications applications. Most economic development professionals are well aware that telecommunications is becoming an important dimension of rural infrastructure and competitiveness, but few know what to do about that. They need to be informed about specific technologies that have been used in communities like theirs, and about how those technologies are actually purchased, implemented, and evaluated. They also need to learn more about the infrastructure available in their communities, and to understand the capabilities that infrastructure makes possible.

In addition, special programs should be created for industry-specific audiences. Many rural communities rely on one or two major industries for most of their employment. By targeting these industries and setting up programs on telecommunications innovations especially for them, leaders can help assure the economic stability of their community. If a community is highly dependent on wood products manufacturing, for example, local developers could work with state industry associations, industry leaders, manufacturers of equipment, and federal agencies involved in rural development such as Economic Development Administration, Appalachian Regional Commission, and the Rural Electrification Administration to develop and hold such a program. Because telecommunications can help support both manufacturing and service-oriented businesses, programs like these can help local communities diversify their economies into the service-oriented segments of their traditional agriculture, manufacturing, and extraction industries.

Telecommunications providers and economic development professionals should also work together to train technical assistance providers about telecommunications technologies. Most states have technical assistance programs, through which businesses and other organizations can get advice on new technologies, marketing, and other business practices. The technical assistance is often provided through a state university or economic development organization. In some cases, the professionals who provide the assistance are not familiar with telecommunications technologies, so those applications are not considered by the businesses requesting assistance. With training and materials about telecommunications, these professionals would be in a better position to refer businesses to the available capacities and providers in their area.

Finally, telecommunications providers themselves must improve their education and marketing efforts in rural communities. In a telecommunications marketplace based on competition, consumers will have to articulate their demand for new products and services, but they cannot do this if they do not understand the products and services that are available. It is primarily the job of telecommunications providers to educate their customers, just like in any other high-tech product line. For small rural telephone companies, this is a matter of life or death: if their communities are not competitive and economically stable, their own businesses will soon suffer. For large telephone companies, the rural commitment may be

more difficult to make, because much of their attention is focused on their urban markets. However, if large telephone companies do not begin to educate and market new services to their rural customers now, they will soon find competition eroding those markets, just like they now find in urban areas.

c. Include Telecommunications in Economic Development Programs

There are a number of federal and state agencies that support economic development programs, including the Departments of Agriculture, Commerce, Defense, and Health and Human Services, at the federal level. All federal agencies involved in rural development programs should consider telecommunications planning and coordination as an economic development strategy, and funding for strategic planning, telecommunications equipment and services should be part of their programs.

Conclusion

Telecommunications has significant potential to contribute to economic development in rural America. For the full power of this opportunity to be realized, however, action is required by many different players in a number of jurisdictions and industries. As an association of regional development organizations, we see our role as a facilitator of partnerships that could help make telecommunications opportunities a reality in rural America. We have described some of the ways that telecommunications can contribute to development in rural America, and we have set out several goals for realizing that contribution. We have called upon telecommunications policy makers, the telecommunications industry, and economic development professionals to help our nation achieve these goals. We are glad to serve as a facilitator, and we look forward to working with all interested parties to refine our analysis and goals, and to begin making the changes that will help keep rural communities competitive into the 21st century.

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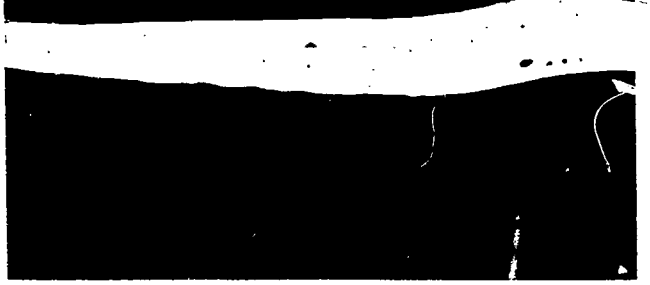
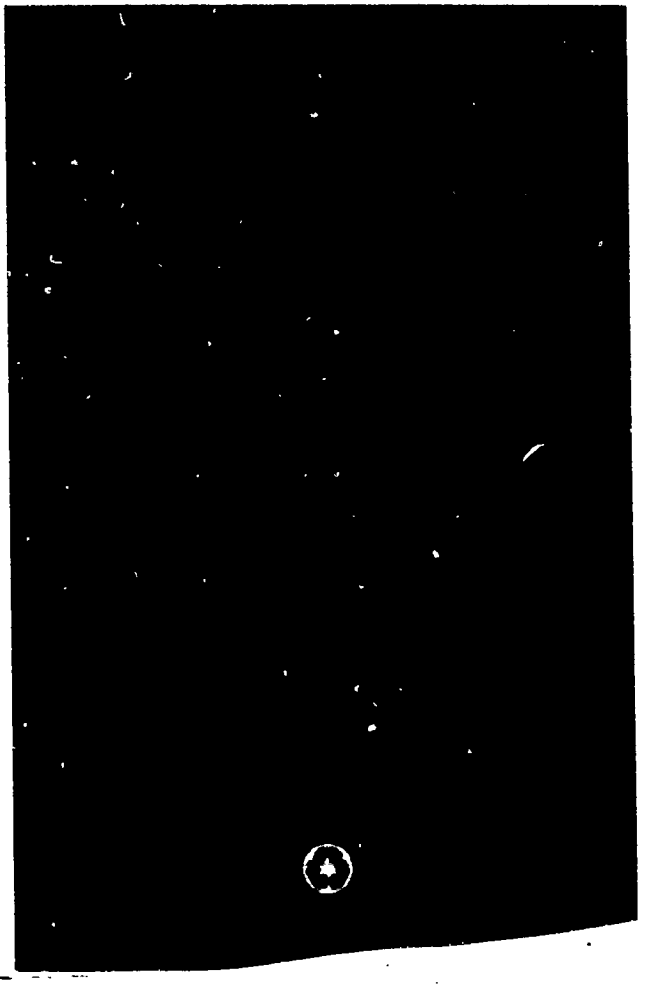


The National Association of Development Organizations (NADO) is a public interest group founded in 1967 to help professionals and local elected officials share information and ideas. The association is the leading advocate for a regional approach to economic and community development. NADO's goal is to assure that all rural citizens have the same access to employment opportunities, and a comparable quality of life, as those who live in urban areas.

NADO provides information and technical assistance through publications, training, and policy analysis. *NADO News*, a weekly newsletter, reports on federal policy, analyzes research, and highlights successful regional programs.

The NADO Research Foundation was established in 1988 to provide research, education, and training. The foundation produces the *Economic Development Digest*, a monthly publication for development professionals and local officials.

The Research Foundation also conducts Revolving Loan Fund, and Regional Solid Waste Management training, maintains a database of innovative development programs and has sponsored an international economic development exchange program. The NADO Research Foundation is also sponsoring a national program to encourage collaboration among governmental and non-governmental organizations in rural areas, funded by the Ford Foundation.



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